UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF SAFETY AND ENVIRONMENTAL ENFORCEMENT
GULF OF MEXICO REGION

ACCIDENT INVESTIGATION REPORT

1. OCCURRED
   DATE: **18-DEC-2012** TIME: **1430** HOURS

2. OPERATOR: **Chevron U.S.A. Inc.**
   REPRESENTATIVE:
   TELEPHONE:
   CONTRACTOR: **Transocean Offshore**
   REPRESENTATIVE:
   TELEPHONE:

3. OPERATOR/CONTRACTOR REPRESENTATIVE/SUPERVISOR ON SITE AT TIME OF INCIDENT:

4. LEASE: **G22367**
   AREA: **KC** LATITUDE:
   BLOCK: **736** LONGITUDE:

5. PLATFORM:
   RIG NAME: **T.O. DISCOVERER INDIA**

6. ACTIVITY:
- [X] EXPLORATION(POE)
- [ ] DEVELOPMENT/PRODUCTION (DOCD/POD)

7. TYPE:
- [ ] HISTORIC INJURY
  - [ ] REQUIRED EVACUATION
  - [ ] LTA (1-3 days)
  - [ ] LTA (>3 days
  - [ ] RW/JT (1-3 days)
  - [ ] RW/JT (>3 days)
  - [ ] Other Injury
- [ ] FATALITY
- [X] POLLUTION
- [ ] FIRE
- [ ] EXPLOSION
- LWC
  - [ ] HISTORIC BLOWOUT
  - [ ] UNDERGROUND
  - [ ] SURFACE
  - [ ] DEVERTER
  - [ ] SURFACE EQUIPMENT FAILURE OR PROCEDURES
- COLLISION [ ] HISTORIC [ ] >$25K [ ] <=$25K
- [ ] STRUCTURAL DAMAGE
- [ ] CRANE
- [ ] OTHER LIFTING DEVICE
- [ ] DAMAGED/DISABLED SAFETY SYS.
- [X] INCIDENT >$25K **Cost of damaged equipment only**
- [ ] H2S/15MIN./20PPM
- [ ]
- [ ] REQUIRED MUSTER
- [ ] SHUTDOWN FROM GAS RELEASE
- [ ] OTHER

6. OPERATION:
- [ ] PRODUCTION
- [X] DRILLING
- [ ] WORKOVER
- [ ] COMPLETION
- [ ] HELICOPTER
- [ ] MOTOR VESSEL
- [ ] PIPELINE SEGMENT NO.
- [ ] OTHER

8. CAUSE:
- [X] EQUIPMENT FAILURE
- [ ] HUMAN ERROR
- [ ] EXTERNAL DAMAGE
- [ ] SLIP/TRIP/FALL
- [ ] WEATHER RELATED
- [X] LEAK
- [ ] UPSET H2O TREATING
- [X] OVERBOARD DRILLING FLUID
- [X] OTHER **LMRP Connector Failure**

9. WATER DEPTH: **6500** FT.

10. DISTANCE FROM SHORE: **240** MI.

11. WIND DIRECTION:
    SPEED: M.P.H.

12. CURRENT DIRECTION:
    SPEED: M.P.H.

13. SEA STATE: FT.

17. INVESTIGATION FINDINGS:

Summary:
On 18 December 2012, the Transocean Discoverer India (TO India) drill ship under contract to Chevron USA Inc. (Chevron) reported a discharge of approximately 400 barrels (bbls) of 11.7 pounds per gallon (ppg) synthetic base mud (SBM) during well operations on Well 002 (Moccasin #2) located in Keathley Canyon Block 736. Chevron notified the National Response Center (NRC Report #1033668) and reported the estimated 400 bbls SBM spill into the Gulf of Mexico. On 19 December 2012, Chevron updated the 11.7 ppg SBM spill amount to 414 bbls.

Chronological Order of Events:
At 0430 hours on 17 December 2012, drill pipe became stuck at the measured depth (MD) of 15,615 feet (ft) below the 18-inch (in) casing shoe set at 13,980 ft MD. Jarring operations were initiated in an attempt to free the stuck drill pipe.

At 0400 hours on 18 December 2012, Blowout Preventer (BOP) control fluid was detected leaking from the blue pod side with a remote operated vehicle (ROV). At 1430 hours, a loss of 11.7 ppg SBM was observed at the shakers, in the trip tank and in the riser; therefore, jarring operations were suspended. At 1445 hours the annular was closed and the loss of 11.7 ppg SBM stopped. At 1538 hours, the ROV observed a SBM plume at the interface of the lower marine riser package (LMRP) and BOP stack connection; consequently, the well was secured by closing the middle pipe rams. In addition, the ROV noted a 2 to 3 inch separation on the blue pod side between the LMRP and BOP that was connected with a GE Oil & Gas-Vetco (GE-Vetco) DW HD H4 LMRP connector. At 1640 hours, Chevron reported the estimated 400 bbl SBM leak from the LMRP-BOP connection to the Bureau of Safety and Environmental Enforcement (BSEE).

On 19 December 2012, Chevron initiated well plug and abandon (P&A) operations to retrieve the LMRP and BOP stack. Chevron also updated the 11.7 ppg SBM discharge amount to 414 bbls and reported a BOP control fluid discharge amount of 33 bbls.

On 2 January 2013, Chevron completed well P&A activities and began preparations to retrieve the LMRP and BOP stack. On 4 January 2013, as the LMRP and BOP were being unlatched, the ROV observed that LMRP connector had completely parted between the upper and lower bodies. The H4 connector lower body remained attached to the BOP stack and the upper body on the LMRP.

On 5 January 2013, the LMRP with the H4 connector upper body was pulled to the surface with the riser. On 6 January 2013, the BOP stack with the H4 connector lower body was pulled to the surface on drill pipe using a BOP "donut" retrieval tool.

On 8 January 2013, Transocean reported that the H4 connector bolts had been inspected by Stress Engineering Services (SES) on board the TO India and were shipped to SES's Houston, Texas (TX) facility for analysis. In addition, the lower and upper bodies of the H4 connector were removed for field inspection and transportation to SES for analysis.

On 15 January 2013, the BSEE Lake Jackson District (LJD) visited the SES facility in Houston, TX and conducted written and photographic documentation of the TO India's H4 connector. Chevron and SES informed the BSEE LJD of the current status of the investigation and future plans.

On 24 January 2013, Chevron held a meeting with BSEE in New Orleans, Louisiana and presented its preliminary findings on the LMRP-BOP connector loss of integrity that caused the SBM discharge to the ocean. Chevron's preliminary investigation revealed that the TO India's GE-Vetco DW HD H4 connector bolts had failed due to hydrogen embrittlement resulting in the lower and upper bodies parting. Chevron reported that an estimated total of 430 bbls of 11.7 ppg SBM was discharged into offshore waters when the H4 connector had initially parted and created an approximate 2 to 3 inch gap on the blue side.

On 25 January 2013, GE released Safety Notice 13-001 - H4 Connector Bolt Inspection Required (P/N H10004-2) to industry that recommended inspection of its H4 connectors that were installed with bolts that were manufactured from June 2007 to October 2009.

On 29 January 2013, BSEE released Safety Alert No. 303 - Lower Marine Riser Package (LMRP) Connector Failure that informed industry about the recent incidents of H4 connector bolt failures and recommended corrective actions to taken by the operators.

On 6 February 2013, a replacement GE-Vetco DW HD H4 connector, witnessed by an independent third-party contractor, was installed and tested with newly manufactured GE-approved bolts on the TO India.

On 21 March 2013, Chevron and Transocean released the final TOP-SET Level I Investigation Report that discussed the sequence of events, identified root causes, and made recommendations to prevent a reoccurrence of this type of incident.

18. LIST THE PROBABLE CAUSE(S) OF ACCIDENT:

Chevron and Transocean identified the probable cause of the SBM spill to the partial (2 to 3 inch) parting of the upper and lower bodies of the GE-Vetco DW HD H4 LMRP connector that provided a pathway for the SBM to be discharged into offshore waters.

19. LIST THE CONTRIBUTING CAUSE(S) OF ACCIDENT:

A Chevron and Transocean combined incident investigation listed a contributing cause of the SBM spill to the failure of the bolts that joined the upper and lower bodies of the GE-Vetco DW HD H4 LMRP connector. Additionally, the investigation revealed that the TO India's GE-Vetco H4 HD LMRP connector bolts had failed due to hydrogen embrittlement since they were not properly manufactured to operate in marine environments.

The combined investigation (Chevron, Transocean, et. al.) did not rule out other contributing factors to cause the hydrogen embrittlement that include operational and process concerns regarding the bolts' manufacture and service. BSEE is evaluating these factors.

20. LIST THE ADDITIONAL INFORMATION:

21. PROPERTY DAMAGED:

A GE-Vetco DW HD H4 LMRP connector.

NATURE OF DAMAGE:

The GE-Vetco DW HD H4 LMRP connector was damaged when the lower and upper bodies parted.

ESTIMATED AMOUNT (TOTAL): **$703,000**

22. RECOMMENDATIONS TO PREVENT RECURRANCE NARRATIVE:

The BSEE Lafayette District makes no recommendations to the Office of Safety Management.

23. POSSIBLE OCS VIOLATIONS RELATED TO ACCIDENT: **YES**

24. SPECIFY VIOLATIONS DIRECTLY OR INDIRECTLY CONTRIBUTING. NARRATIVE:

Based on the incident investigation finds, a E-100 Incident of Noncompliance (INC) was issued "After the Fact" to document that Chevron U.S.A. Inc. (Chevron) failed to prevent the unauthorized discharge of pollutants into offshore waters. On December 18, 2012, Chevron failed to prevent an unauthorized discharge of approximately 432 barrels of 11.7 pounds per gallon synthetic base mud (SBM) into offshore waters from a parted lower marine riser package (LMRP) connector during well operations on Well #002 located at Keathley Canyon Block 736 using the Transocean Discoverer India drill ship.

25. DATE OF ONSITE INVESTIGATION:

26. ONSITE TEAM MEMBERS:

Troy Naquin /

29. ACCIDENT INVESTIGATION PANEL FORMED: **NO**

OCS REPORT:

30. DISTRICT SUPERVISOR:

Elliott S. Smith

APPROVED DATE: **23-APR-2013**